

# **RELIABILITY BENEFITS OF PRICE-RESPONSIVE DEMAND**

**ERIC HIRST**

**Consultant in Electric-Industry Restructuring**

**Oak Ridge, TN**

**Eric@EHirst.com      [www.EHirst.com](http://www.EHirst.com)**

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# RETAIL LOADS SHOULD BE ABLE TO PARTICIPATE IN ALL WHOLESALE MARKETS

- Day-ahead energy and congestion management

- Day-ahead ancillary services

- Spinning reserves
- Nonspinning reserves
- Replacement reserves

**Loads should be able to set prices, not just be price takers!**

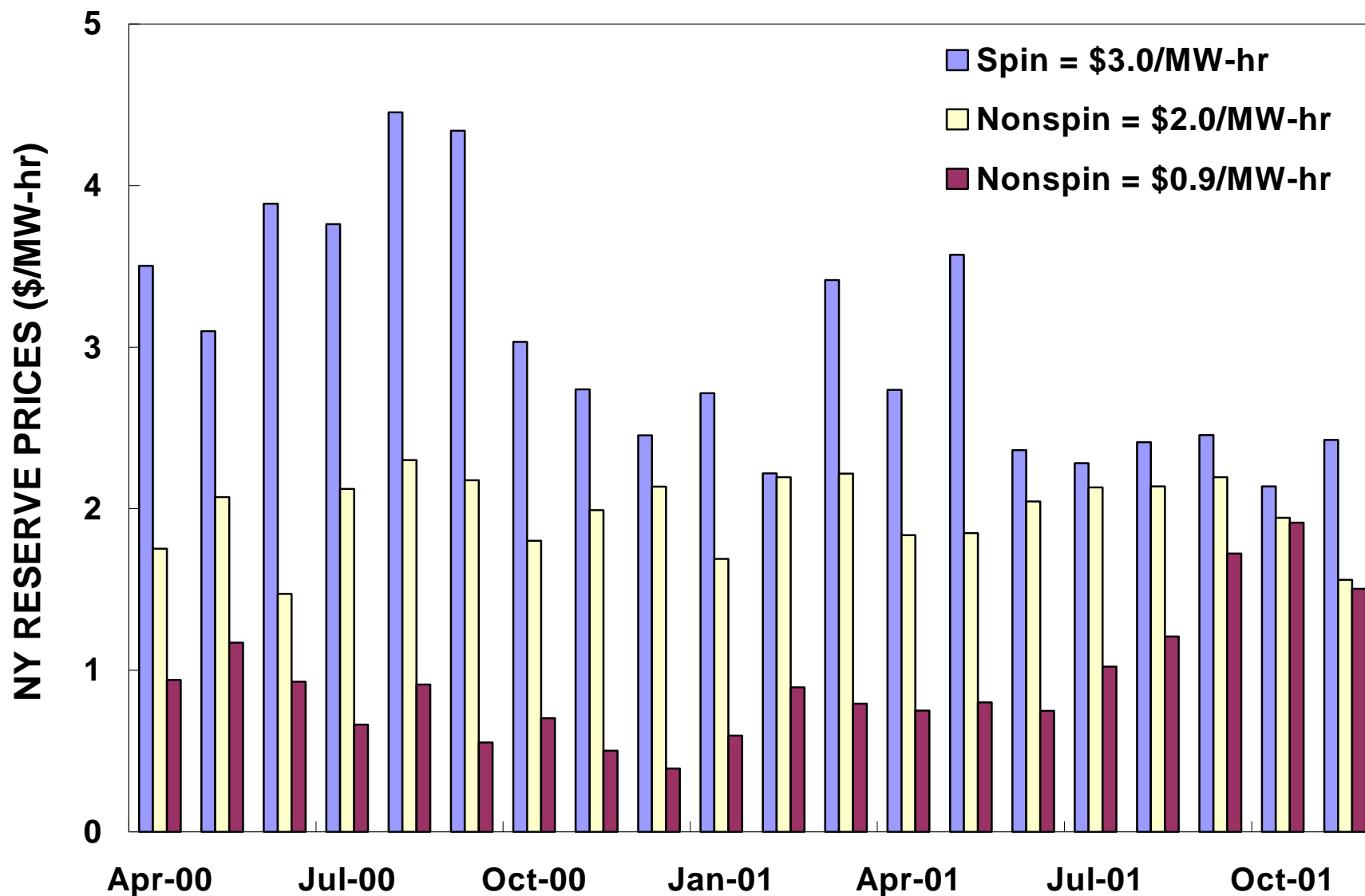
- Real-time (intrahour) energy and congestion management

- Involuntary load interruptions

# **CURRENT POLICIES LIMIT DEMAND PARTICIPATION**

- **NERC Policy 1 limits spinning reserve to “unloaded generation that is synchronized ...”**
  - **At least 50% of contingency reserves must be spinning**
- **But NERC Disturbance Control Standard calls only for 15-minute recovery with no intermediate response**
- **Demand exclusion affects reliability and economic efficiency**
  - **Limits amount of reliability resources**
  - **Raises cost to maintain reliability**
- **Proposed Policy 1 changes are technology neutral**

# DEMAND EXCLUDED FROM LUCRATIVE RESERVE MARKET



# **MUNICIPAL WATER SYSTEMS COULD PROVIDE SPINNING RESERVE**

- **Water treatment/pumping = 3 - 4% of U.S. electric use**
- **Storage in pipelines and tanks makes spinning reserve feasible**
  - **could provide up to 50% of U.S. spin needs**
- **Adjustable speed drives would**
  - **enable provision of spin**
  - **improve efficiency of water operations**
  - **eliminate congestion concerns**
  - **improve local voltage regulation**
- **Other customers with storage also good candidates**

# **INVOLUNTARY LOAD INTERRUPTIONS UNCOMPENSATED**

- **Last resort, interrupt loads to protect power system:**
  - **rolling blackouts, under-frequency and under-voltage relays**
- **Generators paid for contingency reserves, so loads should be paid for bulk-power interruptions**
- **If loads paid, say, \$1000/MWh-interrupted, some customers will pay more to avoid interruptions and others will accept less to be interrupted**
  - **lead to interruption markets**

# KEY QUESTIONS

- Will regulators permit customers to face realtime prices
- Will customers
  - choose to do so
  - respond to realtime prices
- Will technologies and programs be cost effective
- Should RTOs
  - Accommodate price-responsive demand  
or
  - Create markets and run programs

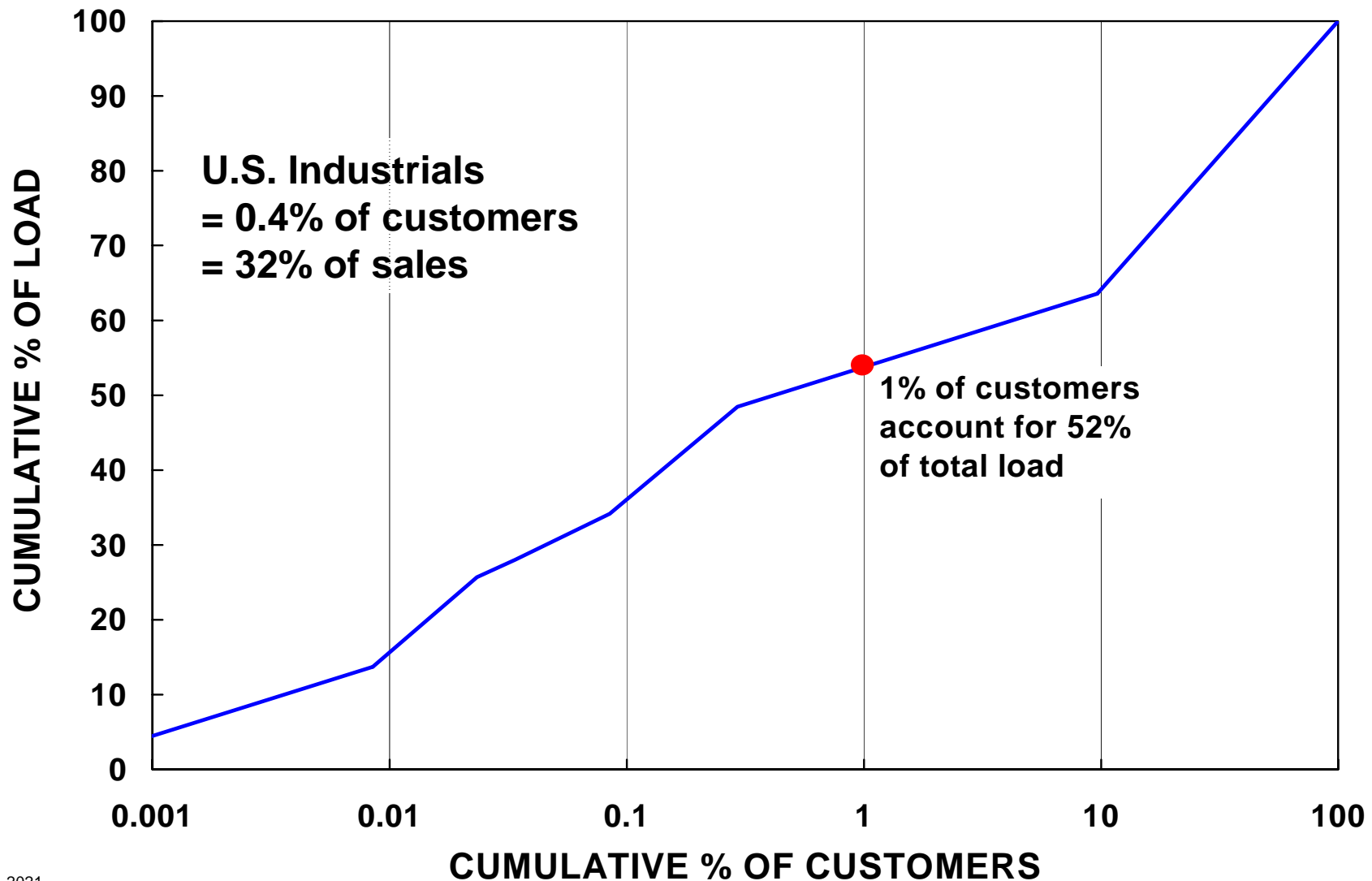


# **ELECTRICITY PRICE HAS TWO COMPONENTS**

- **The electricity commodity (kWh)**
- **Insurance (risk management)**
  - Price protection
  - Quantity protection
- **Customers and regulators need to recognize both elements of electricity pricing!**
- **See my paper on “Financial and Physical Insurance Benefits ...”**



# ONLY A FEW LARGE CUSTOMERS NEEDED TO HAVE LARGE EFFECT



# **REGULATORY BARRIERS MAY BE LARGEST OBSTACLE TO PRD**

- **Standard-offer services priced too low  
(ignoring risk-management part of price)**
  - **Robs customers of incentive to cut demand**
  - **Prevents competitors from competing**
- **Load profiling: prevents suppliers and customers from responding to dynamic pricing**
- **Metering competition: Indecision delays installation of interval meters and communication systems**
- **Utilities: lost distribution revenues, potential stranded costs, loss of high-load-factor customers from standard tariff, ISO vs utility programs**
- **FERC price caps**
- **FERC vs PUC jurisdiction**

# INSTITUTIONAL OBSTACLES MATTER

- Widespread beliefs that
  - Electricity prices should be time invariant
  - Customers will not (cannot) respond to dynamic prices
- Reliability community and ISOs focus on supply
  - Demand assumed to be fixed (i.e., price inelastic)
  - Software limitations for scheduling and dispatch
- Suppliers, especially those with market power, lose money if demand is price responsive

# WHAT SHOULD PUCs DO?

- **Ensure standard-offer service is priced fairly**
  - **Consistent with wholesale prices**
  - **Recognizes insurance premium**
- **Require installation of interval meters, especially for larger customers (e.g., > 20 kW)**
- **Decide whether metering and communications is to be competitive or remain a monopoly service**
- **Encourage all retail providers to offer price-responsive demand programs, protect utility from lost distribution revenues**

# WHAT SHOULD FERC AND RTOs DO?

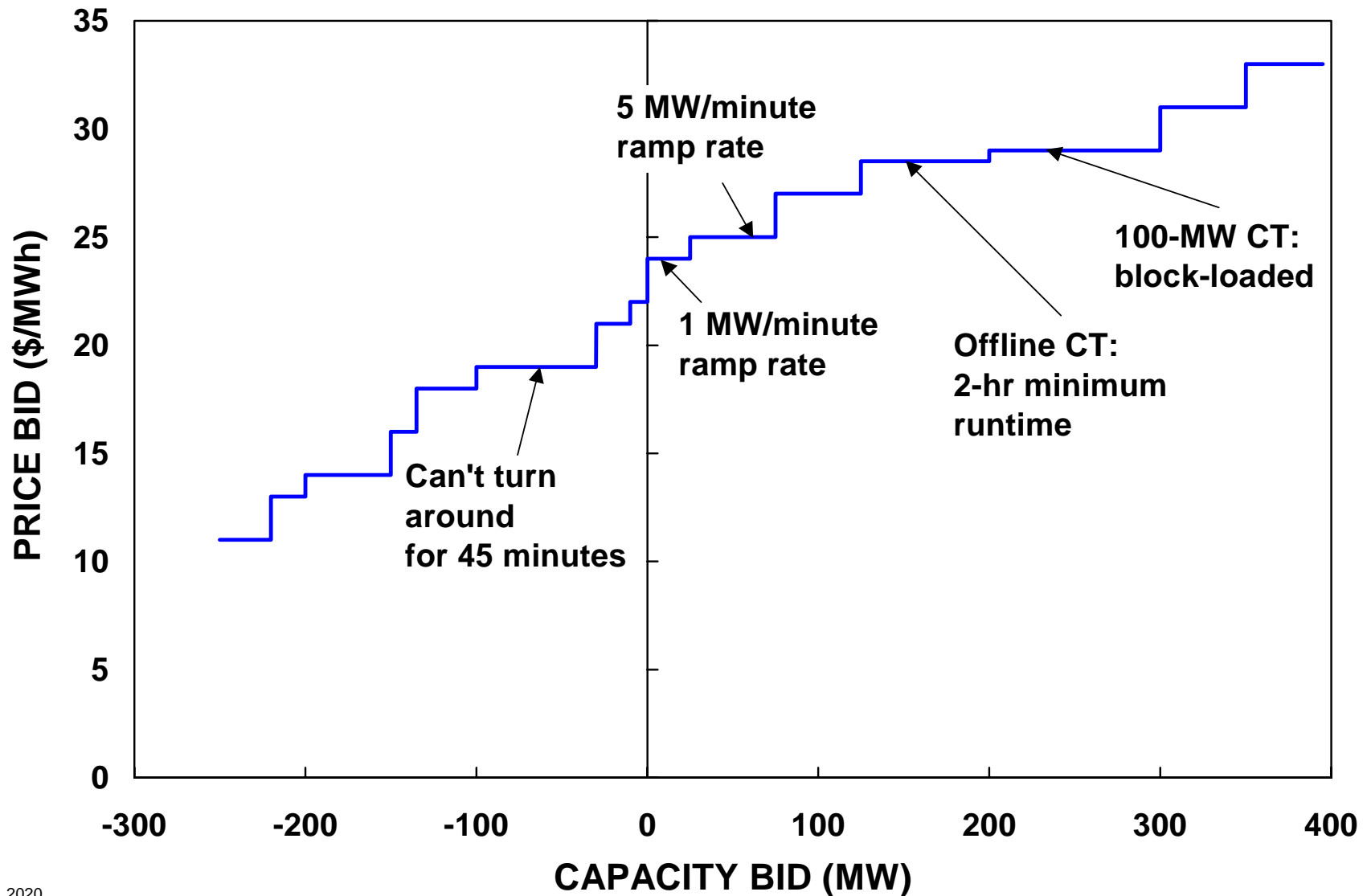
## ■ FERC

- Use bully pulpit to promote price-responsive demand
- Require ISOs and RTOs to accommodate PRD
- Avoid price caps

## ■ RTOs

- Ensure fair and consistent treatment of demand and supply in markets and operations
- Permit demand to bid into all energy, congestion, and ancillary-service markets
- Pay loads for involuntary interruptions
- Offer programs?

# RTOs RECOGNIZE SUPPLY DIFFERENCES, DO SAME FOR DEMAND



# **DYNAMIC PRICING HAS BRIGHT FUTURE IF WE ...**

- **Eliminate regulatory (PUC) barriers**
  - Recognize costs to supplier of providing time-invariant prices
  - Permit recovery of these risk-management costs
  - Balance promotion of competition with desire to “protect” customers
- **Educate customers on benefits of, and how to respond to, time-varying prices**
- **Overcome technical obstacles**
  - Demonstrate metering, communications, and control technologies
  - Lower costs of these technologies